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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,388	09/30/2003	Chih-Tsung Shih	10119731	3746
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EXAMINER LAVARIAS, ARNEL C				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/673,388

Applicant(s)

SHIH ET AL.

Examiner

Amel C. Lavarias

Art Unit

2872

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 10-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 10-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendments to Claims 4-5 in the submission dated 1/18/08 are acknowledged and accepted. In view of these amendments, the objections to the claims in Section 7 of the Office Action dated 9/18/07 are respectfully withdrawn. Further, the rejections under 35 U.S.C. 112, 1st paragraph, in Section 9 of the Office Action dated 9/18/07 are respectfully withdrawn.
2. The addition of Claim 13 in the submission dated 1/18/08 is acknowledged and accepted.

Response to Arguments

3. The Applicants' arguments filed 1/18/08 have been fully considered but they are not persuasive.
4. The Applicants argue that, with respect to Claim 1, as well as Claims 2-6, 10-12 which depend on Claim 1, the combined teachings of Fan and Tehrani fail to teach or reasonably suggest the curved lens and the second collimator defining a resonance cavity to determine a resonance frequency. The Examiner respectfully disagrees. It is particularly noted that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Further, as is known, to define a resonance cavity, at

least two reflectors are required. Though the claimed limitations of Claim 1 do not explicitly set forth a second reflector, Applicants' Figures 1-3 (See in particular 20, 21 in Figures 1-3) clearly disclose that the second collimator includes a reflector at the end of the collimator. The combined teachings of both Fan and Tehrani disclose such a feature (See for example Figures 4-6 of Fan and Figure 3 of Tehrani).

5. Claims 1-6, 10-13 are now rejected as follows.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3-5, 11, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (U.S. Patent No. 6807342), of record, in view of Tehrani (U.S. Patent No. 5430574), of record.

Fan discloses a tunable filter (See Abstract; Figures 2, 4; col. 2, line 13-col. 3, line 17) with a wide free spectral range, comprising a first optical fiber (See for example 24 in Figure 2, 24' in Figure 4); a second optical fiber (See for example 22 in Figure 2, 22' in Figure 4) with one end opposed to the first optical fiber; and a reflector (See for example 12, 13, 14, 16, 18, spacer between 16 and 13 in Figure 2; 13, 14, 18', spacer and grounded layer in Figure 4; wherein all of these layers have been taken, as a whole, to be a single piece) interposed between the first optical fiber and the second optical fiber, the

reflector comprising a curved lens (See 12, 18 in Figure 2; 25 in Figure 6); wherein the curved lens and the second optical fiber define a resonance cavity to determine a resonance frequency (See 18, 19 in Figure 2; 18', 19' in Figure 4; wherein the resonance frequency for a Fabry-Perot resonance cavity is necessarily as disclosed as Equation 1 (See col. 4) in Fan). Fan additionally discloses the curved lens being a multilayered film formed with alternate layers of GaAs and AlAs or alternate layers of TiO_2 and SiO_2 (See col. 2, lines 22-65); the reflector comprising a base (See for example 16 in Figure 2); an aperture (See central portion of layer 16) defined on the base; and a multi-layered film (See 12, 18 in Figure 2) with high reflection capability formed on the base and extending over the aperture, wherein the multi-layered film extending over the aperture serves as the curved lens (See 12, 18 in Figure 2; 25 in Figure 6) and the curved lens has no contact with the base; and the tunable filter being an electrostatic-actuated type filter (See col. 2, lines 22-65), the reflector being a micro-electromechanical system-based (MEMS-based) one-piece reflector (See for example 12, 13, 14, 16, 18, spacer between 16 and 13 in Figure 2; 13, 14, 18', spacer and grounded layer in Figure 4; wherein all of these layers have been taken, as a whole, to be a single piece) comprising a dielectric layer and an electrode layer sequentially formed on a base with an aperture, both the dielectric layer and the electrode layer have an opening corresponding to the aperture (See for example 13, 14 in Figure 2); and the curved lens being apart from the first optical fiber (See for example 12, 18, 24 in Figure 2). Fan lacks the first and second optical fibers including collimators. However, Tehrani teaches a tunable filter with a wide free spectral range (See for example Figures 3-7 of Tehrani), comprising a first collimator on a first optical

fiber (See 14 in Figure 3 of Tehrani); a second collimator on a second optical fiber and opposed to the first collimator (See 15 in Figure 3 of Tehrani); and a mirror (See 21 in Figure 3 of Tehrani) interposed between the first and second collimators, with an appropriate tilt angle (It is noted that the surface of the mirror at the point of light incidence is tilted orthogonally to the propagation axis of the incident light) and a high reflectivity lens, such as a concave lens (It is noted that the mirror 21 provides a surface with a concave curvature which will also inherently provide a lensing/focusing function to the incident light reflected back from element 21 in Figure 3 of Tehrani), whereby a resonance cavity is defined in a space between the mirror and the second collimator (See space between 21 and 22 in Figure 3 of Tehrani). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first and second optical fibers of the tunable filter of Fan include collimators, as taught by Tehrani, for the purpose of mode matching and focusing the incident light to reduce optical losses.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan in view of Tehrani as applied to Claim 1 above, and further in view of Domash (U.S. Patent Application Publication US 2003/0072009 A1), of record.

Fan in view of Tehrani discloses the invention as set forth above in Claim 1, except for the tunable filter being a heat actuated type filter. However, the use of heat-, piezoelectric-, and electrostatic-based actuators to adjust the Fabry-Perot reflector spacing to provide center wavelength tunability is well known and conventional in the art. For example, Domash et al. teaches a tunable thin film Fabry-Perot filter (See for

example 101 in Figure 1), wherein central wavelength tunability is provided for by the use of a heat conducting film resistor deposited onto the Fabry-Perot filter, the film resistor being connected to a temperature controller (See 102 in Figure 1; Figures 3-9; Paragraphs 0059-0068). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the tunable filter of Fan in view of Tehrani, be a heat actuated type filter, as taught by Domash et al., for the purpose of providing rapid, repeatable, and wide shifts in the transmission wavelengths of the filter without use of moving parts.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan in view of Tehrani as applied to Claim 1 above, and further in view of Huang (U.S. Patent No. 6263128), of record.

Fan in view of Tehrani discloses the invention as set forth above in Claim 1, except for an antireflection layer coated on the end of the first collimator. However, the use of antireflective coatings on surfaces of optical elements, such as collimators and lenses, are well known and standard practice in the art. For example, Huang teaches a particular embodiment of a Fabry-Perot etalon filter (see for example Figures 6-7), wherein the surfaces of one or both of the collimators (See 71, 72 in Figure 7) may be coated with an antireflective film (See 77 in Figure 7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have an antireflection layer be coated on the end of the first collimator, as taught by Huang, in the tunable filter of Fan in view of Tehrani, for the purposes of reducing optical noise due to unwanted back reflections in the incident signal.

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan in view of Tehrani as applied to Claim 1 above, and further in view of Pan (U.S. Patent No. 5359683), of record.

Fan in view of Tehrani discloses the invention as set forth above in Claim 1, except for each of the first and the second collimators having an inclined plane. However, Pan teaches conventional fiber optic based collimators (See in particular Figures 3-5 of Pan), wherein such conventional fiber optic collimators include a cylindrical glass ferrule (See 24 in Figures 3-4 of Pan), a graded index lens (GRIN lens) (See 21 in Figures 3-4 of Pan), and a hollow cylindrical holder (See 30 in Figures 3-4 of Pan). In addition, Pan teaches that the fiber optic collimators include a slanted surface (See 24A in Figure 4 of Pan) with an anti-reflection (AR) coating (See 24A, 29 in Figure 4; col. 3, lines 47-59 of Pan). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have each of the first and the second collimators of Fan in view of Tehrani, have an inclined plane, as taught by Pan, for the purpose of reducing insertion loss and minimizing unwanted light reflections at the surfaces.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan in view of Tehrani.

Fan in view of Tehrani discloses the invention as set forth above in Claim 1, except for the second collimator having a lens surface with a reflective layer. However, both Fan and Tehrani further teach that a reflective layer may be placed on the second optical fiber/collimator (See for example 19', 22' in Figure 4 of Fan; 22, 15 in Figure 3 of Tehrani). Additionally, Tehrani teaches that a collimating lens may be utilized as part of

the optical fiber collimating assembly (See 15 in Figure 3; col. 3, lines 25-39 of Tehrani), and that the lens surface of the collimating lens may include the reflective layer (See for example 22 in Figure 3 of Tehrani). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the second collimator have a lens surface with a reflective layer, as additionally taught by Fan and Tehrani, for the purpose of simplifying alignment of the reflective layer with respect to the second collimator, while providing appropriate light energy concentration/focusing or collimation based on the intended application.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 10:00 AM - 6:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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3/31/08

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